Resource Conservation and Recovery Act, Subtitle C Compliance Evaluation/Land Disposal Restrictions Inspection

U.S. Steel Clairton Works
400 State Street
Clairton, PA
Latitude N 40° 18' 25"
Longitude W 79° 52' 30"

EPA RCRA ID No: PAD004498010

Inspection Date: September 24 and 25, 2013

EPA Representative:	Wilbur Martínez Environmental Engineer
PADEP Representative	John Kendall Waste Management Specialist
Facility Representatives:	James Hosfield Industrial Wastewater/Solid Waste Engineer
	Aaron F. Signarovitz, EIT Environmental Engineer
	Mark Jeffrey Director – Environmental

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Table of Contents

List of Photographs

List of Attachments

Attachment 1: Uniform Hazardous Waste Manifests

Background

The EPA Region III's Office of Enforcement, Compliance and Environmental Justice (OECEJ) at Fort Meade, Maryland received a request from EPA Region III's Land and Chemicals Division to conduct a Resource Conservation and Recovery Act (RCRA), Subtitle C, Hazardous Waste Management Inspection of the U.S. Steel Clairton Works facility (the Facility) located at 400 State Street, Clairton, Pennsylvania. U.S. Steel Clairton Works is the largest coke manufacturing facility in the United States. The inspection was assigned to Mr. Wilbur Martínez, who conducted the inspection on September 24 and 25, 2013. The Pennsylvania Department of Environmental Protection (PADEP) was notified of the inspection on September 9, 2013, and Mr. John Kendall, Solid Waste Specialist, was present during the first day of the inspection.

Facility RCRA Status

The Facility (EPA RCRA ID No.PAD004498010) is classified as a large quantity generator (LQG).

Facility Description

The Standard Industrial Classification (SIC) code for the Facility is 3312. The North American Industry Classification System (NAICS) code for the Facility is 324199.

The Facility is located at 400 State Street in Clairton city in Allegheny County, Pennsylvania at latitude N 40° 18' 25" and longitude W 79° 52' 30". The facility is located 20 miles south of Pittsburgh on 392 acres along 3.3 miles of the west bank of the Monongahela River.

The Facility is the largest by-products coke plant in North America. It operates nine coke batteries and produces approximately 10,000 tons of metallurgical coke per day from the destructive distillation (carbonization) of more than 16,000 tons of coal. At the time of the inspection, the Facility operated 24 hours per day, seven days per week. According to Risk Management Plan data obtained from the Right-to-Know Network website, in 2012 the Facility employed 1,276 full-time personnel.

Except for a strip of land projecting west of Route 837 (State Street) and north of Maple Avenue, and a 17-acres in holding occupied by Koppers Inc., the Facility lies contiguous to the west bank of the Monongahela River, bound by State Street to its north, west, and south. The Facility is surrounded, where applicable, by security fencing to the north, south, and west. A steep bank along the Monongahela River provides security to the east, with some fencing installed, as needed, along the embankment. Entrances to the Facility are located at Maple Avenue, the Main Office (contractor's entrance), the Benzene Bridge (Koppers entrance), and the Wabash gate (pedestrian access only). All gates are staffed 24 hours per day, seven days per week.

The southern third of the property is used primarily for storage and minimal operations activities. It contains the coke oven maintenance shop, emergency wastewater storage tanks, coke storage areas, the Facility hospital, fire department, several abandoned buildings, the Facility's hazardous waste storage pad, and one of the Facility's wildlife refuges.

The central third of the property is the main operations area, which contains the coal handling equipment, the nine by-product coke batteries, a chemical processing plant, a wastewater treatment plant, and the plant utility functions (steam and electric power generation).

The northern third of the Facility is used as a coal storage yard and diesel fuel station for heavy equipment. The Koppers Inc. property occupies the central portion of this area. The Koppers Inc. Clairton Plant converts crude coke oven tars produced by the U.S. Steel Clairton Works into liquid pitch and other liquid products such as creosote and chemical oil.

Inspection Summary

In Briefing/General Facility Information

Upon arrival at the Facility in the morning of September 24, 2013, the EPA inspector presented his credentials to Messrs. James Husfield, Industrial Wastewater/Solid Waste Engineer, Aaron F. Signarovitz, Environmental Engineer, and Mark Jeffrey, Director – Environmental Control Department, identifying himself as duly authorized inspector. At that time, the EPA inspector provided to the Facility a brief description of EPA's RCRA, Subtitle C Hazardous Waste Management Inspection process, along with a brief description of the scope of the inspection. During the in-briefing, and throughout the course of the inspection, the EPA inspector questioned the Facility representatives about the general Facility operations and the waste generation activities. The following paragraphs describe the general Facility information provided as part of the in-briefing, as well as other relevant general information provided by the Facility during the course of the inspection.

The Facility operations generally involve two main production activities: coke production from the non-destructive distillation of coal, and by-products recovery. The by-products recovery consists of processing the coke oven gasses resulting from coke production to recover the by-products coal tar, anhydrous ammonia, light oil, and hydrogen sulfide in the gases, and the processing of the recovered hydrogen sulfide to produce elemental sulfur as a final by-product.

Coke production begins with the unloading of coal from barges along the Monongahela River. The coal is pulverized in one of four pulverizers located along the river bank. The pulverized coal is then transported by conveyor belts to various storage bunkers located throughout the Facility. From there, a batch of pulverized coal is loaded, using conveyor belts, into one of the nine coke oven batteries where the batch of coal is heated, in the absence of air, at 2,000 to 2,100 degrees Fahrenheit for approximately 18 hours to yield metallurgical coke and coke oven gases. The coke oven batteries use natural gas as startup fuel. When the coking process is complete in an individual battery, the contents of the battery is pushed into a railroad-quenching car. The car is moved to one of a number of quench towers where the coke is cooled with water and then emptied into coke wharves. From there, the coke is conveyed to a screening station where it is sized for shipment as a final product. Fugitive emissions from the coke oven batteries are controlled with baghouses. The coke dust recovered in the baghouses is collected and sold as a product. The gases generated during the coking process are collected and transported to the Facility's chemical processing plant for by-products recovery.

Recirculated flushing liquors are sprayed onto the hot coke oven gas withdrawn from the coke oven batteries under vacuum for cooling. The majority of the coal tar in the raw gas drops out with this initial cooling. The condensed tar and flushing liquor flow into decanter tanks where the tar and water phases are separated. The excess flushing liquor, which is the result of both process water and inherent moisture in the coal, is the major source of contaminated water from the coke plant and is sent for treatment at the Facility's wastewater treatment plant. The recovered coal tar is sent to customers to be distilled into various tar products. This coal tar recovery process generates decanter tar sludge. This decanter tar sludge, which would otherwise be managed as K087 hazardous waste, is instead collected in steel hoppers and transported by truck to the First Unit AKJ Processing Area, where it is converted into a pumpable fuel that is used by the Facility to control the bulk density of the coal that is fed to the coke oven batteries.

AKJ Industries, Inc. is a contractor that performs this AKJ Industries patented process on site. The process generally consists of adding corn oil to the coal tar decanter sludge in a primary processing tank where it is impacted, sheared, and heated with steam to bring the finished material into a homogeneous liquid mixture with the appropriate viscosity. The resulting fuel is then sprayed onto the coal on the conveyor belt as it is being fed to the ovens. According to Mr. Art Fosbrink, AKJ Plant Manager, the coal tar decanter sludge could be staged one to two days before being processed.

The now partially cooled coke oven gas resulting from the coal tar recovery process is scrubbed with a recycled solution of ammonium phosphate to recover anhydrous ammonia in a process known as the U.S. Steel Phosam Process. The process uses ammonia still distillate recovered in the Facility's wastewater treatment plant and produces wastewater that is sent for treatment at the Facility's wastewater treatment plant.

Following the Phosam Process, the coke oven gas is further processed in a cryogenic system whereby the gases are cooled to an extremely low temperature to separate out light oils and acid gases (i.e., hydrogen sulfide). Light oil recovered at the Facility's wastewater treatment plant is also added to the cryogenic system. The hydrogen sulfide removal is facilitated via a conventional carbonate absorption and vacuum stripping system. The light oil product recovered in the cryogenic system is sent to a storage area for shipment to refiners while the concentrated hydrogen sulfide stream is retained for further processing. After removing the light oil and hydrogen sulfide, the coke gas travels through a hydrogen cyanide destruction unit to further clean the gas. The coke gas is then used as fuel for the coke oven batteries and for other U.S. Steel Mon Valley Plants. The process of light oil and hydrogen sulfide recovery produces wastewater that is sent for treatment at the Facility's wastewater treatment plant.

After recovery, the concentrated hydrogen sulfide stream is processed through a Claus Plant to produce elemental sulfur. A Shell Claus Off-Gas Treatment Plant is used to remove traces of sulfur from the Claus Plant tail gas. This process produces wastewater that is sent for treatment at the Facility's wastewater treatment plant. The process also generates spent catalyst that is disposed-of as hazardous waste.

The Facility's wastewater treatment plant includes settling tanks, ammonia stills, and a biological treatment system. Ammonia still lime sludge, which would otherwise be managed as K060 hazardous waste, is instead placed into a hopper and used in the coke oven batteries where it is allowed to trickle onto the coal on the conveyor belt as it is being fed to the ovens; this process is performed by AKJ Industries, Inc. The wastewater treatment bio-sludge, after being dewatered in a belt press, is sent for disposal to an off-site landfill as a non-hazardous waste. Overflow from the wastewater plant clarifier goes out as effluent to a National Pollutant Discharge Elimination System (NPDES) permitted discharge (PA0004472).

In addition to the wastes generated directly from the coke production, by-products recovery, air pollution control, and wastewater treatment processes, the Facility also generates wastes from ancillary operations that include steam and electrical power generation, equipment maintenance operations, and quality assurance laboratory analyses. These wastes include waste generated from steam boiler feed water treatment; tank cleanouts; waste generated from spills and equipment cleanout; demolition debris; used oil, spent oil and gasoline filters, used antifreeze, and spent batteries from vehicle maintenance; spent aerosol cans; oily rags; spent lamps; spent non-vehicle batteries; mercury containing equipment; baghouse bags; personal protective equipment; spent filters (from engineering controls); spent solvents; and spent filters (used in laboratory analyses). The Facility also generates spent carbon from an ongoing groundwater treatment action at the site. Hazardous waste determinations are based on generator knowledge and testing of the waste. At the time of the inspection, the Facility had developed 176 different waste profiles. The Facility manages its used oil under the Pennsylvania waste oil rules; spent lamps and non-vehicle batteries are managed as universal wastes; spent vehicle batteries are exchanged with the vendor.

At the time of the inspection, hazardous wastes generated at the Facility were being managed in containers at fourteen Hazardous Waste Accumulation Areas (HWAAs) and several satellite accumulation areas (SAAs) distributed throughout the Facility. The fourteen HWAAs were as follows:

- Drum Storage Building
- Laboratory Hazardous Waste Storage Shed
- Hazardous Waste Storage Pad
- CDR (1) Tar Debris Hopper Storage Area
- CDR (2) Tar Debris Hopper Storage Area
- CDR Tar Debris Roll-off Storage Area
- First Unit Cooler Tar Debris Hopper Storage Area
- Second Unit Cooler Tar Debris Hopper Storage Area
- Summit Environmental Tar Debris Hopper Storage Area

- #1 Control Room Tar Debris Hopper Storage Area
- Tank Farm Tar Debris Hopper Storage Area
- Tank Farm Shed Tar Debris Hopper Storage Area
- Sulfur Plant Tar Debris Hopper Storage Area
- AKJ Industries First Unit Process Area Tar Debris Hopper Storage Area

The Facility keeps an electronic database that works in conjunction with its container inspection program to track the accumulation time of all of the hazardous waste accumulation containers, and schedules its hazardous waste pickups accordingly. No evidence of similar databased for the tracking of satellite accumulation containers was observed during the inspection.

The Facility uses 10- to 30-cubic yards vacuum boxes (see Photograph 1) to accumulate the spent catalyst from the hydrogen cyanide destruction unit, the Claus Plant, and the Claus Shell Claus Off-Gas Treatment Plant (according to the Facility, these wastes contain 500 parts per million by weight (ppmw) or more). Except for the roll-off in service at the CDR at the time of the inspection, tar debris is collected in hoppers placed throughout the Facility (see Photographs 2 to 4) and are eventually consolidated into a roll-off at the Hazardous Waste Storage Pad (see Photograph 5) [no specific Material Safety Data Sheet (MSDS) was available for this waste, but the MSDS for the Tar Decanter Sludge indicates that the decanter sludge contains about 6 percent VOCs]. Other hazardous wastes generated at the Facility are managed in drums of between 40- and 55-gallon capacity meeting Department of Transportation (DOT) shipping requirements, or in containers with less than a 26-gallon capacity.

Scope of the Inspection

The inspection included the visual inspection of six of the HWAAs and of ten SAAs located within four different buildings. The inspection also included the review of the Facility's inspection and training records, as well as of the Facility's Integrated Contingency Plan. The inspection also included reviewing the Facility's copies of its Uniform Hazardous Waste Manifests and Land Disposal Restriction Notification Certification forms for the three years prior to the inspection.

Specifically, the visual inspection covered the following Facility locations:

- Drum Storage Building
- Laboratory Hazardous Waste Storage Shed
- Hazardous Waste Storage Pad
- First Unit Cooler Tar Debris Hopper Storage Area
- Tank Farm Shed Tar Debris Hopper Storage Area
- AKJ Industries First Unit Process Area Tar Debris Hopper Storage Area
- AXI Compressor Repair Shop

- Boiler Shop
- Garage
- Laboratory

Observed Issues of Concern

Garage

The point of contact at this location at the time of the inspection was Mr. Tobey Kuroda, Garage Dispatcher/Equipment Operator. Equipment serviced at the Garage includes front end loaders, cranes, trucks, and load sweepers. Wastes generated at the Garage include used oil, spent oil and gasoline filters, spent parts washer solvent, and spent aerosol cans. According to Mr. Kuroda, vehicle batteries are vendor exchanged. According to Mr. Craig Pittman, mechanic at the Garage, spent oil filters are drained and crushed; however, spent gasoline filters, when generated, are mixed with the spent oil filters for the purpose of management and disposal.

Drum Storage Building

The Drum Storage Building is used for the accumulation of hazardous wastes, non-hazardous wastes, and universal waste lamps and batteries in 55-gallon drums, 5-gallon pails, totes, and fiber tubes. Just outside of the Drum Storage Building is a cabinet for the accumulation of spent universal waste lamps that is used by the Facility electricians to accumulate the spent lamps until they are taken inside the Drum Storage Building to be packed into their corresponding fiber drums for ultimate shipment for disposal (see Photograph 6). The cabinet is divided into three compartments for spent high-intensity discharge lamps (HID lamps), spent 4-foot fluorescent lamps, and spent 8-foot fluorescent lamps, respectively. One of the compartments did not have a latch and could not be securely closed.

Laboratory

The point of contact at this location at the time of the inspection was Ms. Christin Geletei, Laboratory Environmental Supervisor. According to Ms. Geletei, the Laboratory performs in-process sampling and quality assurance/quality control analyses on coal and coke. Additionally, the Laboratory conducts chemical analyses to monitor the water discharge requirements under the Facility's NPDES permit. An SAA consisting of a 15-gallon container for the accumulation of tar contaminated debris was observed in Room 114 (see Photograph 7). At the time of the inspection, the hazardous waste container was closed, but was not labeled "Hazardous Waste" or with descriptions of its contents.

Uniform Hazardous Waste Manifests and Land Disposal Restriction Notification Certification Forms

During the review of the Uniform Hazardous Waste Manifests and Land Disposal Restriction Notification Certification forms, thirteen manifests were observed to have a gap between the date the generator signed the manifest and the date the first transporter acknowledge receipt of the materials being shipped (see Attachment 1).